# Appendix A
# Initial CHART Assessment for the
# Puget Sound Chinook Salmon ESU

## CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Steve Keller, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another Federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of the deliberations or formal scoring/rating process: Bill Graeber (NOAA Fisheries) and Tom Sibley (NOAA Fisheries). This CHART assessment also benefitted from review and comments by staff from the Nooksack Indian Tribe, Point No Point Treaty Council, and Washington Department of Fish and Wildlife.

## ESU Description

Puget Sound chinook salmon were listed as a threatened species in 1999 (64 FR 14307; March 24, 1999). The Puget Sound chinook ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound. This ESU includes the Straits of Juan De Fuca from the Elwha River, eastward, as well as rivers and streams flowing into Hood Canal, South Sound, North Sound, and the Strait of Georgia in Washington (64 FR 14208; March 24, 1999). The ESU includes genetically similar spring-, summer-, and fall-run chinook populations that overlap substantially in their migration and spawn timing (Myers et al. 1998). Chinook salmon (and their progeny) from the following hatchery stocks are considered part of the listed ESU: Kendall Creek (spring run); North Fork Stillaguamish River (summer run); White River (spring run); Dungeness River (spring run); and Elwha River (fall run).

A Technical Recovery Team (TRT) has been formed to assist recovery planning efforts in the Puget Sound domain. In 2001 and 2002, the Puget Sound TRT released technical reports describing independent populations of chinook salmon in Puget Sound (Ruckelshaus et al. 2001, 2002, 2004). To date the Puget Sound TRT has identified 22 independent chinook populations: the North Fork Nooksack River, South Fork Nooksack River, Lower Skagit River, Upper Skagit River, Lower Sauk River, Suiattle River, Upper Sauk River, Cascade River, North Fork Stillaguamish River, South Fork Stillaguamish River, Skykomish River, Snoqualmie River, North Lake Washington, Cedar River, Green/Duwamish River, Puyallup River, White River, Nisqually River, Skokomish River, Dosewallips River, Dungeness River, and Elwha River. Some naturally spawning

aggregations of chinook were not recognized as part of these populations (e.g., the Deschutes River in South Puget Sound). The TRT has concluded that chinook salmon using smaller streams in south and central Puget Sound probably did not occur there in large numbers historically and were not independent populations. It is not clear whether these smaller streams are occupied due to recent hatchery releases or whether historically they supported small satellite populations that were dependent on larger independent populations (B. Graeber, NOAA Fisheries, personal communication).

The following life history descriptions are taken from the NOAA Fisheries status review of chinook salmon (Myers et al. 1998). Adult spring-run chinook salmon in the Puget Sound typically return to freshwater in April and May and spawn in August and September (Orrell 1976, WDFW et al. 1993). Adults migrate to the upper portions of their respective river systems and hold in pools until they mature. In contrast, summer-run fish begin their freshwater migration in June and July and spawn in September, while summer/fall-run chinook salmon begin to return in August and spawn from late September through January (WDF et al. 1993). In rivers with an overlap in spawning time, temporal runs on the same river system maintain a certain amount of reproductive isolation through geographic separation.

The majority of Puget Sound fish emigrate to the ocean as subyearlings. Many of the rivers have well-developed estuaries that are important rearing areas for emigrating ocean-type smolts. In contrast, the Suiattle and South Fork Nooksack Rivers have been characterized as producing a majority of yearling smolts (Marshall et al. 1995). Glacially influenced conditions on the Suiattle River may be responsible for limiting juvenile growth, delaying smolting, and producing a higher proportion of 4- and 5-year-olds compared to other chinook salmon stocks in Puget Sound, which mature predominantly as 3- and 4-year-olds. Puget Sound stocks exhibit a similarity in marine distribution based on CWT recoveries in ocean fisheries. Tagged fish have been primarily captured in Canadian coastal and Puget Sound waters.

Myers et al. (1998) also noted that anthropogenic activities have limited the access to historical spawning grounds and altered downstream flow and thermal conditions. Water diversion and hydroelectric dams have prevented access to portions of several rivers. Watershed development and activities throughout Puget Sound, Hood Canal, and Strait of Juan de Fuca regions have resulted in increased sedimentation, higher water temperatures, decreased large woody debris recruitment, decreased gravel recruitment, a reduction in river pools and spawning areas, and a loss of estuarine rearing areas (Bishop and Morgan 1996). These impacts on the spawning and rearing environment may also

have had an impact on the expression of many life-history traits and masked or exaggerated the distinctiveness of many stocks.

Juvenile chinook salmon in freshwater feed on a variety of terrestrial and aquatic insects and crustaceans, while subadults feed on similar items as well as larger prey including fishes, shrimp, and squid (Scott and Crossman, 1973). One study noted that adults in marine waters forage on a large array of fish species, especially herring and sand lance (Pritchard and Tester 1944 as cited in Scott and Crossman 1973).

**CHART Area Assessments and Initial Conservation Value Ratings**

The Puget Sound Technical Recovery Team (TRT) has identified 5 "geographic regions of diversity and correlated risk" in Puget Sound that are intended to assist in evaluating ESU-wide recovery scenarios (Ruckelshaus et al. 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus et al. 2002). The Puget Sound chinook salmon ESU occupies all of these regions. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these five geographic regions.

The CHART assessment for this ESU addressed 18 subbasins containing 61 occupied watersheds. Subbasins were chosen as freshwater critical habitat units because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU.

**Unit 1. Strait of Georgia Subbasin (HUC4# 17110002)**

The Strait of Georgia subbasin is located in northern Puget Sound (near the U.S. Canada border) and contained in Skagit and Whatcom counties, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 428 $mi^2$. Fish distribution and habitat use data from WDFW identify approximately 71 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the

watersheds. Map A1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 2. Nooksack Subbasin (HUC4# 17110004)**

The Nooksack subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU these watersheds encompass approximately 795 $mi^2$. Fish distribution and habitat use data from WDFW identify approximately 256 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Nooksack River and South Fork Nooksack River. Occupied reaches in one HUC5 (Upper North Fork Nooksack River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 3. Upper Skagit Subbasin (HUC4# 17110005)**

The Upper Skagit subbasin is located in northern Puget Sound and contained in Skagit and Whatcom counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 999 $mi^2$. Fish distribution and habitat use data from WDFW identify approximately 105 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 4. Sauk Subbasin (HUC4# 17110006)**

The Sauk subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 741 $mi^2$ and 2,234 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 118 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified three historically independent populations in this subbasin: Lower Sauk River, Suiattle River, and Upper Sauk River. Occupied reaches in four HUC5s (Upper Suiattle River, Lower Suiattle River, Upper Sauk River, and Lower Sauk River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 5. Lower Skagit Subbasin (HUC4# 17110007)**

The Lower Skagit subbasin is located in northern Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 447 $mi^2$ and 1,592 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 149 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified six historically independent populations in this subbasin: Lower Skagit River, Upper Skagit River, Cascade River, Lower Sauk River, Suiattle River, and Upper Sauk River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 6. Stillaguamish Subbasin (HUC4# 17110008)**

The Stillaguamish subbasin is located in north-central Puget Sound and contained in Skagit and Snohomish counties, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 704 $mi^2$ and 2,302

miles of streams. Fish distribution and habitat use data from WDFW identify approximately 132 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Fork Stillaguamish River and South Fork Stillaguamish River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 7. Skykomish Subbasin (HUC4# 17110009)**

The Skykomish subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 853 $mi^2$ and 2,861 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 153 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Skykomish River) in this subbasin. Occupied reaches in two HUC5s (Tye and Beckler Rivers, and Skykomish River Forks) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A7 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 8. Snoqualmie Subbasin (HUC4# 17110010)**

The Snoqualmie subbasin is located in north-central Puget Sound and contained in King and Snohomish counties, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 504 $mi^2$ and 1,525 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 90 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Snoqualmie River) in this subbasin. The CHART concluded that all of the occupied

areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A8 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 9. Snohomish Subbasin (HUC4# 17110011)**

The Snohomish subbasin is located in north-central Puget Sound and contained entirely in Snohomish County, Washington. The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 278 $mi^2$ and 823 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 101 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Skykomish River and Snoqualmie River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A9 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 10. Lake Washington Subbasin (HUC4# 17110012)**

The Lake Washington subbasin is located in south Puget Sound and contained in King and Snohomish counties, Washington. Lake Washington is a dominant feature in this subbasin. The subbasin contains four watersheds occupied by this ESU and these watersheds encompass approximately 619 $mi^2$ and 1,087 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 190 miles of occupied riverine/estuarine habitat in these watersheds. Lake Washington contains approximately 40 $mi^2$ of lake habitat in these watersheds. Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: North Lake Washington and Cedar River. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. The CHART also determined that, based on a report by Tabor et al. (2004), low gradient reaches near the mouth of the Cedar River (Taylor Creek, Kennydale Creek, and Johns Creek) were also occupied and contained PCEs for this ESU. The CHART determined that these streams as well as that portion of May Creek

with gradients <2% were important occupied rearing areas for the Cedar River population of chinook salmon. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A10 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 11. Duwamish Subbasin (HUC4# 17110013)**

The Duwamish subbasin is located in south Puget Sound and contained in King County, Washington. The subbasin contains three watersheds occupied by this ESU and these watersheds encompass approximately 487 $mi^2$ and 1,433 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 171 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Green/Duwamish River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A11 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 12. Puyallup Subbasin (HUC4# 17110014)**

The Puyallup subbasin is located in south Puget Sound and contained in King and Pierce counties, Washington. The subbasin contains five watersheds occupied by this ESU and these watersheds encompass approximately 996 $mi^2$ and 3,094 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 243 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified two historically independent populations in this subbasin: Puyallup River and White River. Occupied reaches in one HUC5 (Upper White River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A12 depicts the

specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 13. Nisqually Subbasin (HUC4# 17110015)**

The Nisqually subbasin is located in south Puget Sound and contained in Pierce, Thurston, and Lewis counties, Washington (although the latter is not occupied by this ESU). The subbasin contains two watersheds occupied by this ESU and these watersheds encompass approximately 472 $mi^2$ and 1,215 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 82 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) identified one historically independent population (Nisqually River) in this subbasin. The CHART concluded that all of the occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A13 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 14. Deschutes Subbasin (HUC4# 17110016)**

The Deschutes subbasin is located at the southern end of Puget Sound, and most of it is in Thurston County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Lewis County, Washington). The subbasin contains two watersheds occupied by this ESU and these encompass approximately 168 $mi^2$ and 529 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 53 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A14 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 15. Skokomish Subbasin (HUC4# 17110017)**

The Skokomish subbasin is located at the southern end of Hood Canal, and most of it is in Mason County, Washington (although small portions of the subbasin – unoccupied by

this ESU – also extend into Grays Harbor and Jefferson counties, Washington). The subbasin contains a single watershed (Skokomish River HUC5# - 1711001701) and encompasses approximately 248 $mi^2$ and 951 miles of streams. The Skokomish River population is the only population documented in this subbasin/watershed by Ruckelshaus et al. (2001, 2002, 2004). Fish distribution and habitat use data from WDFW identify approximately 72 miles of occupied riverine/estuarine habitat in the watershed (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU, noted that this watershed contains the largest intact estuary in Hood Canal, and and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map A15 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 16. Hood Canal Subbasin (HUC4# 17110018)**

The Hood Canal subbasin includes most of the drainages of Hood Canal proper, including those of the western Kitsap Peninsula. The subbasin includes portions of the following Washington counties: Clallam, Jefferson, Kitsap, and Mason. The subbasin contains six watersheds occupied by this ESU and encompasses approximately 605 $mi^2$ and 2,766 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 59 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Occupied reaches in two HUC5s (Dosewallips River and Duckabush River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The Mid-Hood Canal population is the only historically independent population documented in this subbasin by Ruckelshaus et al. (2001, 2002, 2004). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A16 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 17. Kitsap Subbasin (HUC4# 17110019)**

The Kitsap subbasin includes drainages of eastern Kitsap Peninsula as well as small, frontal drainages of southern and eastern Puget Sound up to Whidbey Island. The subbasin includes portions of the following Washington counties: Island, Jefferson,

King, Kitsap, Mason, Pierce, Snohomish, and Thurston counties. The subbasin contains four watersheds occupied by this ESU and these encompass approximately 721 $mi^2$ and 1,747 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 56 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). However, Ruckelshaus et al. (2001, 2004) did not identify any historically independent populations in this subbasin. The CHART concluded that nearly all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Possible exceptions were streams in the Puget Sound/East Passage HUC5 (e.g., in Pipers Creek, north of Shilshole Bay) where the CHART questioned whether or not listed chinook salmon occur in this watershed. Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A17 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

**Unit 18. Dungeness/Elwha Subbasin (HUC4# 17110020)**

The Dungeness/Elwha subbasin includes drainages to the eastern Strait of Juan de Fuca and includes portions of Clallam and Jefferson counties, Washington. The subbasin contains three occupied watersheds and encompasses approximately 695 $mi^2$ and 2,700 miles of streams. Ruckelshaus et al. (2001, 2004) identified the following historically independent populations in this subbasin: Dungeness River and Elwha River. Chinook salmon in the Port Angeles Harbor HUC5 are not currently assigned to a historically independent population for this ESU. Fish distribution and habitat use data from WDFW identify approximately 47 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Occupied reaches in one HUC5 (Dungeness River) overlap with a FEMAT key watershed for at-risk anadromous salmonids (FEMAT 1994). Table A1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map A18 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

*Marine Areas*

In addition to the freshwater and estuarine areas described above, the CHART also evaluated nearshore marine areas for this ESU. In keeping with the watershed-based

approach used for freshwater and estuarine habitat areas, the Team based their assessment on 19 nearshore zones corresponding to Washington's Water Resource Inventory Areas (see Map A19). The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 meters and adjacent to watersheds occupied by the ESU. The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing chinook salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that habitat areas in all 19 nearshore zones of Puget Sound (including areas adjacent to islands), Hood Canal, and the Strait of Juan de Fuca (to the mouth of the Elwha River) warrant a high rating for conservation value to the ESU (NMFS, 2004a). These habitat areas are found along approximately 2,376 miles (3,824 km) of shoreline within the range of this ESU.

**References and Sources of Information**

References cited above as well as key reports and data sets reviewed by the CHART include the following:

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**Table A1.** Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Puget Sound Chinook Salmon ESU

| Map Code | Subbasin | Watershed | HUC5 Code | Spawning/ Rearing PCEs (mi) | Rearing/ Migration PCEs (mi) | Presence/ Migration Only PCEs (mi)* | Management Activities** |
|---|---|---|---|---|---|---|---|
| A1 | Strait of Georgia | Bellingham Bay | 1711000201 | 4.4 | 0.8 | 6.0 | C, I, U |
| A1 | Strait of Georgia | Samish River | 1711000202 | 16.2 | 4.3 | 20.4 | A, C, U |
| A1 | Strait of Georgia | Birch Bay | 1711000204 | 5.5 | 0.0 | 13.6 | F, U |
| A2 | Nooksack | Upper North Fork Nooksack River | 1711000401 | 15.9 | 4.4 | 5.8 | F, R |
| A2 | Nooksack | Middle Fork Nooksack River | 1711000402 | 7.9 | 0.0 | 4.8 | F, I, R |
| A2 | Nooksack | South Fork Nooksack River | 1711000403 | 35.8 | 1.5 | 10.8 | C, F, R |
| A2 | Nooksack | Lower North Fork Nooksack River | 1711000404 | 52.6 | 0.0 | 15.3 | A, F, G |
| A2 | Nooksack | Nooksack River | 1711000405 | 46.2 | 20.5 | 34.2 | A, C, F |
| A3 | Upper Skagit | Skagit River/Gorge Lake | 1711000504 | 0.0 | 0.0 | 2.8 | D, F, R |
| A3 | Upper Skagit | Skagit River/ Diobsud Creek | 1711000505 | 21.4 | 0.0 | 2.7 | F, R |
| A3 | Upper Skagit | Cascade River | 1711000506 | 16.2 | 0.0 | 5.3 | F |
| A3 | Upper Skagit | Skagit River/Illabot Creek | 1711000507 | 34.0 | 0.0 | 1.1 | F, R |
| A3 | Upper Skagit | Baker River | 1711000508 | 2.0 | 0.0 | 22.4 | D, F, R |
| A4 | Sauk | Upper Sauk River | 1711000601 | 25.9 | 1.1 | 0.2 | F, R |
| A4 | Sauk | Upper Suiattle River | 1711000602 | 8.1 | 0.0 | 0.1 | F, R |
| A4 | Sauk | Lower Suiattle River | 1711000603 | 25.5 | 8.4 | 3.5 | F, R |
| A4 | Sauk | Lower Sauk River | 1711000604 | 31.7 | 10.2 | 3.9 | F |
| A5 | Lower Skagit | Middle Skagit River/Finney Creek | 1711000701 | 59.7 | 1.2 | 25.1 | A |

| Map Code | Subbasin | Watershed | HUC5 Code | Spawning/ Rearing PCEs (mi) | Rearing/ Migration PCEs (mi) | Presence/ Migration Only PCEs (mi)* | Management Activities** |
|---|---|---|---|---|---|---|---|
| A5 | Lower Skagit | Lower Skagit River/ Nookachamps Creek | 1711000702 | 1.3 | 36.0 | 26.1 | A, C, W, U |
| A6 | Stillaguamish | North Fork Stillaguamish River | 1711000801 | 47.2 | 0.1 | 7.6 | F, R |
| A6 | Stillaguamish | South Fork Stillaguamish River | 1711000802 | 24.3 | 1.5 | 9.9 | F, R |
| A6 | Stillaguamish | Lower Stillaguamish River | 1711000803 | 24.0 | 0.8 | 16.7 | F, U, W |
| A7 | Skykomish | Tye And Beckler Rivers | 1711000901 | 0.0 | 0.0 | 27.5 | F, R |
| A7 | Skykomish | Skykomish River Forks | 1711000902 | 28.6 | 0.0 | 13.0 | A, F, U |
| A7 | Skykomish | Skykomish River/Wallace River | 1711000903 | 24.9 | 0.0 | 9.3 | A, F |
| A7 | Skykomish | Sultan River | 1711000904 | 9.8 | 0.0 | 0.0 | D, F, U |
| A7 | Skykomish | Skykomish River/Woods Creek | 1711000905 | 24.5 | 0.0 | 15.0 | A, F, G |
| A8 | Snoqualmie | Middle Fork Snoqualmie River | 1711001003 | 24.4 | 0.4 | 10.4 | A, F |
| A8 | Snoqualmie | Lower Snoqualmie River | 1711001004 | 16.4 | 21.1 | 17.6 | A, F |
| A9 | Snohomish | Pilchuck River | 1711001101 | 16.5 | 9.8 | 9.5 | A, D, F, S |
| A9 | Snohomish | Snohomish River | 1711001102 | 20.5 | 0.1 | 44.3 | C, F, U |
| A10 | Lake Washington | Cedar River | 1711001201 | 22.8 | 0.9 | 1.6 | C, D, F, I, U |
| A10 | Lake Washington | Lake Sammamish | 1711001202 | 23.5 | 1.0 | 12.2 | F, U |
| A10 | Lake Washington | Lake Washington | 1711001203 | 5.7 | 2.6 | 57.0 | F, U |
| A10 | Lake Washington | Sammamish River | 1711001204 | 54.7 | 0.5 | 8.7 | F, U |

| Map Code | Subbasin | Watershed | HUC5 Code | Spawning/ Rearing PCEs (mi) | Rearing/ Migration PCEs (mi) | Presence/ Migration Only PCEs (mi)* | Management Activities** |
|---|---|---|---|---|---|---|---|
| A11 | Duwamish | Upper Green River | 1711001301 | 0.0 | 0.0 | 27.0 | D, F |
| A11 | Duwamish | Middle Green River | 1711001302 | 12.1 | 0.0 | 31.3 | A, D, U |
| A11 | Duwamish | Lower Green River | 1711001303 | 43.2 | 19.0 | 38.1 | C, I, U |
| A12 | Puyallup | Upper White River | 1711001401 | 11.8 | 10.9 | 26.5 | D, F, I |
| A12 | Puyallup | Lower White River | 1711001402 | 8.4 | 48.2 | 27.8 | A, D, I, U |
| A12 | Puyallup | Carbon River | 1711001403 | 28.2 | 3.8 | 24.3 | A, F |
| A12 | Puyallup | Upper Puyallup River | 1711001404 | 8.1 | 11.2 | 36.7 | D, F |
| A12 | Puyallup | Lower Puyallup River | 1711001405 | 4.2 | 17.5 | 10.3 | C, U |
| A13 | Nisqually | Mashel/Ohop | 1711001502 | 32.9 | 4.7 | 1.3 | A, D, U |
| A13 | Nisqually | Lowland | 1711001503 | 32.5 | 3.4 | 6.9 | A, U |
| A14 | Deschutes | Prairie1 | 1711001601 | 14.8 | 0.1 | 9.8 | A, F, G |
| A14 | Deschutes | Prairie2 | 1711001602 | 21.4 | 1.3 | 6.2 | A, F, G |
| A15 | Skokomish | Skokomish River | 1711001701 | 37.7 | 3.7 | 30.5 | C, D, F, U |
| A16 | Hood Canal | Lower West Hood Canal Frontal | 1711001802 | 0.7 | <0.1 | 0.5 | C, F, R, U |
| A16 | Hood Canal | Hamma Hamma River | 1711001803 | 3.8 | 0.0 | <0.1 | C, F |
| A16 | Hood Canal | Duckabush River | 1711001804 | 6.4 | <0.1 | 1.6 | C, F |
| A16 | Hood Canal | Dosewallips River | 1711001805 | 13.0 | 0.5 | <0.1 | C, F, R |
| A16 | Hood Canal | Big Quilcene River | 1711001806 | 2.2 | 0.5 | 0.2 | C, F |
| A16 | Hood Canal | West Kitsap | 1711001808 | 21.9 | 3.1 | 4.5 | A, F, U |
| A17 | Kitsap | Kennedy/ Goldsborough | 1711001900 | 0.0 | 0.0 | 12.1 | A, F, U |
| A17 | Kitsap | Puget | 1711001901 | 8.5 | 0.4 | 19.2 | A, G, U |
| A17 | Kitsap | Prairie3 | 1711001902 | 0.0 | <0.1 | 14.5 | G, U |
| A17 | Kitsap | Puget Sound/East Passage | 1711001904 | 0.0 | 0.0 | 1.2 | C, U |
| A18 | Dungeness/ Elwha | Dungeness River | 1711002003 | 31.8 | <0.1 | 1.2 | C, F, I, R, S, U |

| Map Code | Subbasin | Watershed | HUC5 Code | Spawning/ Rearing PCEs (mi) | Rearing/ Migration PCEs (mi) | Presence/ Migration Only PCEs (mi)* | Management Activities** |
|---|---|---|---|---|---|---|---|
| A18 | Dungeness/ Elwha | Port Angeles Harbor | 1711002004 | 4.7 | 0.0 | 4.8 | F, U |
| A18 | Dungeness/ Elwha | Elwha River | 1711002007 | 5.2 | 1.2 | <0.1 | D, F |

* Some streams classified as "Presence/Migration Only PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm species use type.

** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = hydroelectric dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by Kerwin (1999a), Kerwin (1999b), WSCC (1999), WSCC (2000), Kerwin (2001), Beamer et al. (2000), Haring (2002), Smith (2002), and Kuttel (2003).

**Table A2.** Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A1 | Strait of Georgia | Bellingham Bay | 1711000201 | 4 | Low HUC5 score; not identified as supporting a historically independent population | Low |
| A1 | Strait of Georgia | Samish River | 1711000202 | 7 | Moderate HUC5 score; not identified as supporting a historically independent population; lost connectivity to Skagit River system a key CHART concern for this HUC5 | Low |
| A1 | Strait of Georgia | Birch Bay | 1711000204 | 5 | Low HUC5 score; not identified as supporting a historically independent population | Low |
| A2 | Nooksack | Upper North Fork Nooksack River | 1711000401 | 13 | High HUC5 score; PCEs support one of only two populations in the northern Puget Sound region; PCEs in FEMAT key watershed | High |
| A2 | Nooksack | Middle Fork Nooksack River | 1711000402 | 9 | Moderate HUC5 score; PCEs are more limited in this HUC5 relative to other HUC5s in this region | Medium |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A2 | Nooksack | South Fork Nooksack River | 1711000403 | 14 | High HUC5 score; PCEs support one of only two populations in the northern Puget Sound region | High |
| A2 | Nooksack | Lower North Fork Nooksack River | 1711000404 | 14 | High HUC5 score; PCEs support both populations in the northern Puget Sound region | High |
| A2 | Nooksack | Nooksack River | 1711000405 | 14 | High HUC5 score; PCEs support both populations in the northern Puget Sound region | High |
| A3 | Upper Skagit | Skagit River/Gorge Lake | 1711000504 | 16 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A3 | Upper Skagit | Skagit River/ Diobsud Creek | 1711000505 | 16 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A3 | Upper Skagit | Cascade River | 1711000506 | 16 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A3 | Upper Skagit | Skagit River/Illabot Creek | 1711000507 | 17 | High HUC5 score; PCEs support six of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A3 | Upper Skagit | Baker River | 1711000508 | 9 | Moderate HUC5 score; PCEs are much more limited in this HUC5 (due to dams) relative to other HUC5s in this region | Medium |
| A4 | Sauk | Upper Sauk River | 1711000601 | 17 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |
| A4 | Sauk | Upper Suiattle River | 1711000602 | 14 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A4 | Sauk | Lower Suiattle River | 1711000603 | 14 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |
| A4 | Sauk | Lower Sauk River | 1711000604 | 14 | High HUC5 score; PCEs support three of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |
| A5 | Lower Skagit | Middle Skagit River/Finney Creek | 1711000701 | 17 | High HUC5 score; PCEs support six of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A5 | Lower Skagit | Lower Skagit River/ Nookachamps Creek | 1711000702 | 15 | High HUC5 score; PCEs support six of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A6 | Stillaguamish | North Fork Stillaguamish River | 1711000801 | 12 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A6 | Stillaguamish | South Fork Stillaguamish River | 1711000802 | 11 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A6 | Stillaguamish | Lower Stillaguamish River | 1711000803 | 13 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A7 | Skykomish | Tye And Beckler Rivers | 1711000901 | 16 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A7 | Skykomish | Skykomish River Forks | 1711000902 | 14 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU; PCEs in FEMAT key watershed | High |
| A7 | Skykomish | Skykomish River/Wallace River | 1711000903 | 14 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A7 | Skykomish | Sultan River | 1711000904 | 13 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A7 | Skykomish | Skykomish River/Woods Creek | 1711000905 | 14 | High HUC5 score; PCEs support one of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A8 | Snoqualmie | Middle Fork Snoqualmie River | 1711001003 | 13 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A8 | Snoqualmie | Lower Snoqualmie River | 1711001004 | 15 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A9 | Snohomish | Pilchuck River | 1711001101 | 9 | Moderate HUC5 score; PCEs are more limited in this HUC5 relative to other HUC5s in this region | Medium |
| A9 | Snohomish | Snohomish River | 1711001102 | 14 | High HUC5 score; PCEs support two of ten populations in the central Puget Sound region which is the primary production region for this ESU | High |
| A10 | Lake Washington | Cedar River | 1711001201 | 9 | Moderate HUC5 score but PCEs support entire spawning range for the Cedar River population. | High |
| A10 | Lake Washington | Lake Sammamish | 1711001202 | 8 | Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s | Medium |
| A10 | Lake Washington | Lake Washington | 1711001203 | 8 | Moderate HUC5 score; supports two populations in this region | Medium |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A10 | Lake Washington | Sammamish River | 1711001204 | 7 | Moderate HUC5 score; PCEs supporting spawning for the Sammamish River population are found in two HUC5s | Medium |
| A11 | Duwamish | Upper Green River | 1711001301 | 7 | Moderate HUC5 score; PCEs support fish that are trapped and hauled into this HUC5; PCEs in downstream (and naturally accessible) HUC5s likely to be of higher conservation value for the Green/Duwamish River population | Medium |
| A11 | Duwamish | Middle Green River | 1711001302 | 10 | Moderate HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU; this HUC5 likely to be emphasized for access above Howard Hanson Dam | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A11 | Duwamish | Lower Green River | 1711001303 | 10 | Moderate HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU; PCEs may be most abundant in this HUC5 relative to other HUC5s in this region of the ESU | High |
| A12 | Puyallup | Upper White River | 1711001401 | 15 | High HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A12 | Puyallup | Lower White River | 1711001402 | 14 | High HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A12 | Puyallup | Carbon River | 1711001403 | 13 | High HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A12 | Puyallup | Upper Puyallup River | 1711001404 | 13 | High HUC5 score; PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A12 | Puyallup | Lower Puyallup River | 1711001405 | 11 | Moderate HUC5 score but PCEs support two of six populations in the south Puget Sound region for this ESU | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A13 | Nisqually | Mashel/Ohop | 1711001502 | 10 | Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A13 | Nisqually | Lowland | 1711001503 | 11 | Moderate HUC5 score; important and diverse habitat types (including different ecoregion – southern Puget prairies – from other populations); PCEs support one of six populations in the south Puget Sound region for this ESU | High |
| A14 | Deschutes | Prairie1 | 1711001601 | 4 | Low HUC5 score; not identified as supporting a historically independent population | Low |
| A14 | Deschutes | Prairie2 | 1711001602 | 4 | Low HUC5 score; not identified as supporting a historically independent population | Low |

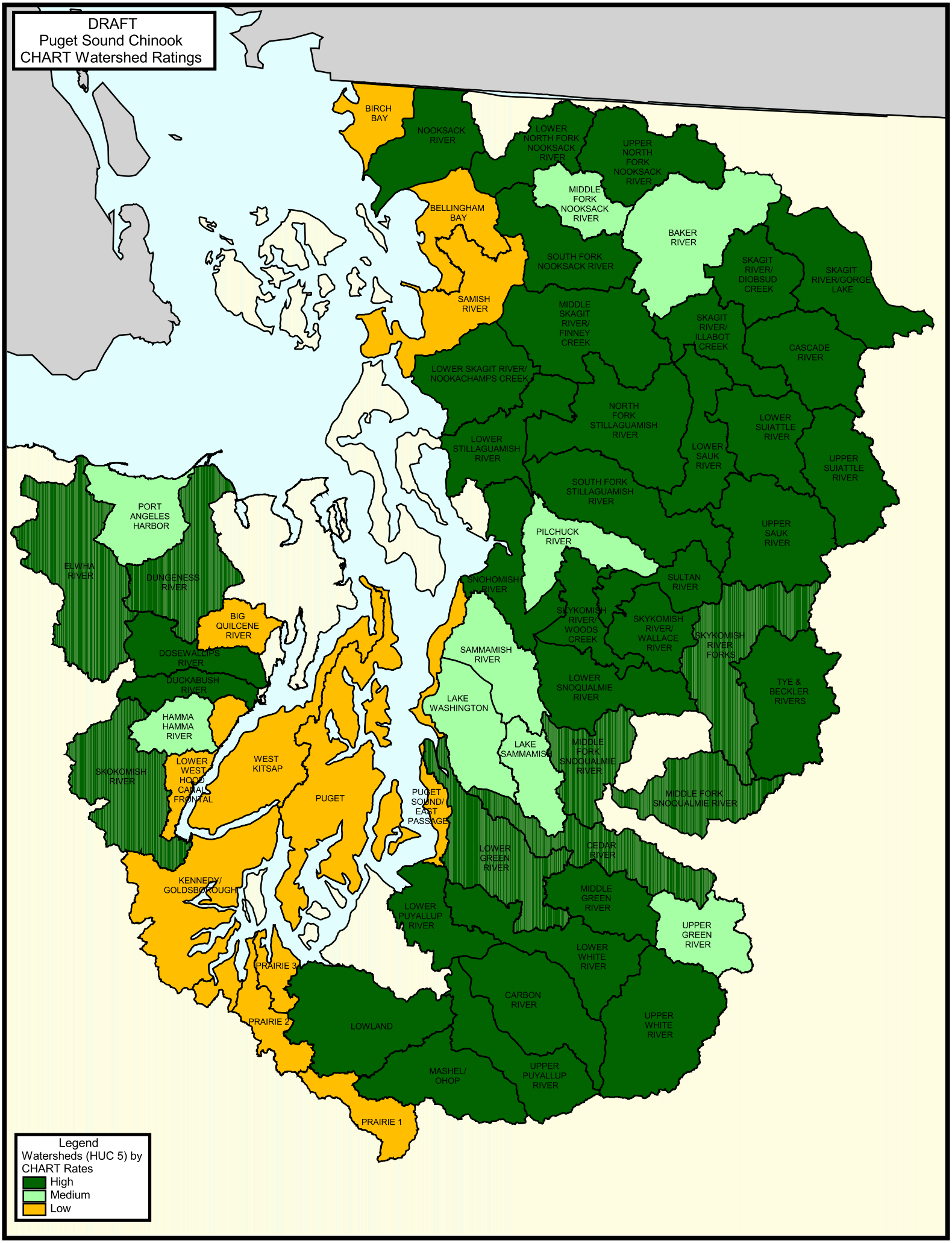
| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A15 | Skokomish | Skokomish River | 1711001701 | 11 | PCEs support one of two historically independent populations identified in Hood Canal region; largest intact estuary in Hood Canal; PCEs in FEMAT key watershed | High |
| A16 | Hood Canal | Lower West Hood Canal Frontal | 1711001802 | 0 | Lowest possible HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here | Low |
| A16 | Hood Canal | Hamma Hamma River | 1711001803 | 5 | Moderate score for a HUC5 in a region that only contains two historically independent populations; more limited distribution here than Duckabush and Dosewallip Rivers | Medium |
| A16 | Hood Canal | Duckabush River | 1711001804 | 8 | Relatively high score for a HUC5 in a region that only contains two historically independent populations; PCEs in FEMAT key watershed | High |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A16 | Hood Canal | Dosewallips River | 1711001805 | 8 | Relatively high score for a HUC5; PCEs support one of two historically independent populations identified in Hood Canal region; PCEs in FEMAT key watershed | High |
| A16 | Hood Canal | Big Quilcene River | 1711001806 | 4 | Low HUC5 score; not identified as supporting a historically independent population; CHART questioned ESU presence here | Low |
| A16 | Hood Canal | West Kitsap | 1711001808 | 4 | Low HUC5 score; not identified as supporting a historically independent population | Low |
| A17 | Kitsap | Kennedy/ Goldsborough | 1711001900 | 4 | Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU | Low |

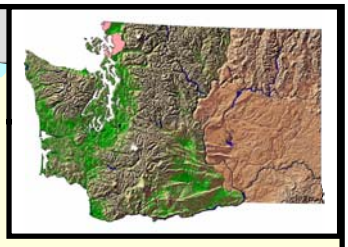
| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A17 | Kitsap | Puget | 1711001901 | 2 | Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU | Low |
| A17 | Kitsap | Prairie3 | 1711001902 | 3 | Low HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU | Low |
| A17 | Kitsap | Puget Sound/East Passage | 1711001904 | 0 | Lowest possible HUC5 score; not identified as supporting a historically independent population; other larger subbasins in this region are likely of greater conservation value to this ESU. Also, CHART questioned ESU presence here | Low |

| Map Code | Subbasin | Watershed | HUC5 Code | Total HUC5 Score (0-18) | Comments/ Other Considerations | Initial CHART Rating of HUC5 Conservation Value |
|---|---|---|---|---|---|---|
| A18 | Dungeness/ Elwha | Dungeness River | 1711002003 | 13 | High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region; PCEs in FEMAT key watershed | High |
| A18 | Dungeness/ Elwha | Port Angeles Harbor | 1711002004 | 5 | Low HUC5 score; not identified as supporting a historically independent population; however only one of three occupied HUC5s in the Strait of Juan de Fuca region | Medium |
| A18 | Dungeness/ Elwha | Elwha River | 1711002007 | 12 | High HUC5 score; supports one of only two extant populations in the Strait of Juan de Fuca region | High |

**Figure A1.** Initial CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Puget Sound Chinook Salmon ESU


DRAFT
Puget Sound Chinook
CHART Watershed Ratings
BIRCH BAY
NOOKSACK RIVER
LOWER NORTH FORK NOOKSACK RIVER
UPPER NORTH FORK NOOKSACK RIVER
MIDDLE FORK NOOKSACK RIVER
BELLINGHAM BAY
BAKER RIVER
SOUTH FORK NOOKSACK RIVER
SKAGIT RIVER/ DIOBSUD CREEK
SKAGIT RIVER/GORGE LAKE
SAMISH RIVER
MIDDLE SKAGIT RIVER/ FINNEY CREEK
SKAGIT RIVER/ ILLABOT CREEK
CASCADE RIVER
LOWER SKAGIT RIVER/ NOOKACHAMPS CREEK
NORTH FORK STILLAGUAMISH RIVER
LOWER SUIATTLE RIVER
LOWER STILLAGUAMISH RIVER
LOWER SAUK RIVER
UPPER SUIATTLE RIVER
SOUTH FORK STILLAGUAMISH RIVER
PORT ANGELES HARBOR
PILCHUCK RIVER
UPPER SAUK RIVER
ELWHA RIVER
DUNGENESS RIVER
SNOHOMISH RIVER
SULTAN RIVER
BIG QUILCENE RIVER
SKYKOMISH RIVER/ WOODS CREEK
SKYKOMISH RIVER/ WALLACE RIVER
SKYKOMISH RIVER FORKS
SAMMAMISH RIVER
DOSEWALLIPS RIVER
LOWER SNOQUALMIE RIVER
TYE & BECKLER RIVERS
DUCKABUSH RIVER
LAKE WASHINGTON
HAMMA HAMMA RIVER
LAKE SAMMAMISH
MIDDLE FORK SNOQUALMIE RIVER
SKOKOMISH RIVER
LOWER WEST HOOD CANAL FRONTAL
WEST KITSAP
PUGET
PUGET SOUND/ EAST PASSAGE
MIDDLE FORK SNOQUALMIE RIVER
LOWER GREEN RIVER
CEDAR RIVER
KENNEDY/ GOLDSBOROUGH
MIDDLE GREEN RIVER
LOWER PUYALLUP RIVER
UPPER GREEN RIVER
LOWER WHITE RIVER
PRAIRIE 3
CARBON RIVER
PRAIRIE 2
LOWLAND
UPPER WHITE RIVER
MASHEL/ OHOP
UPPER PUYALLUP RIVER
PRAIRIE 1
Legend
Watersheds (HUC 5) by CHART Rates
High
Medium
Low

**Maps A1 through A19.** Puget Sound Chinook Salmon ESU – Habitat Areas Under Consideration for Critical Habitat Designation



DRAFT
Puget Sound Chinook Distribution
Strait of Georgia Sub-basin (17110002)

Map A1

**Legend**

- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

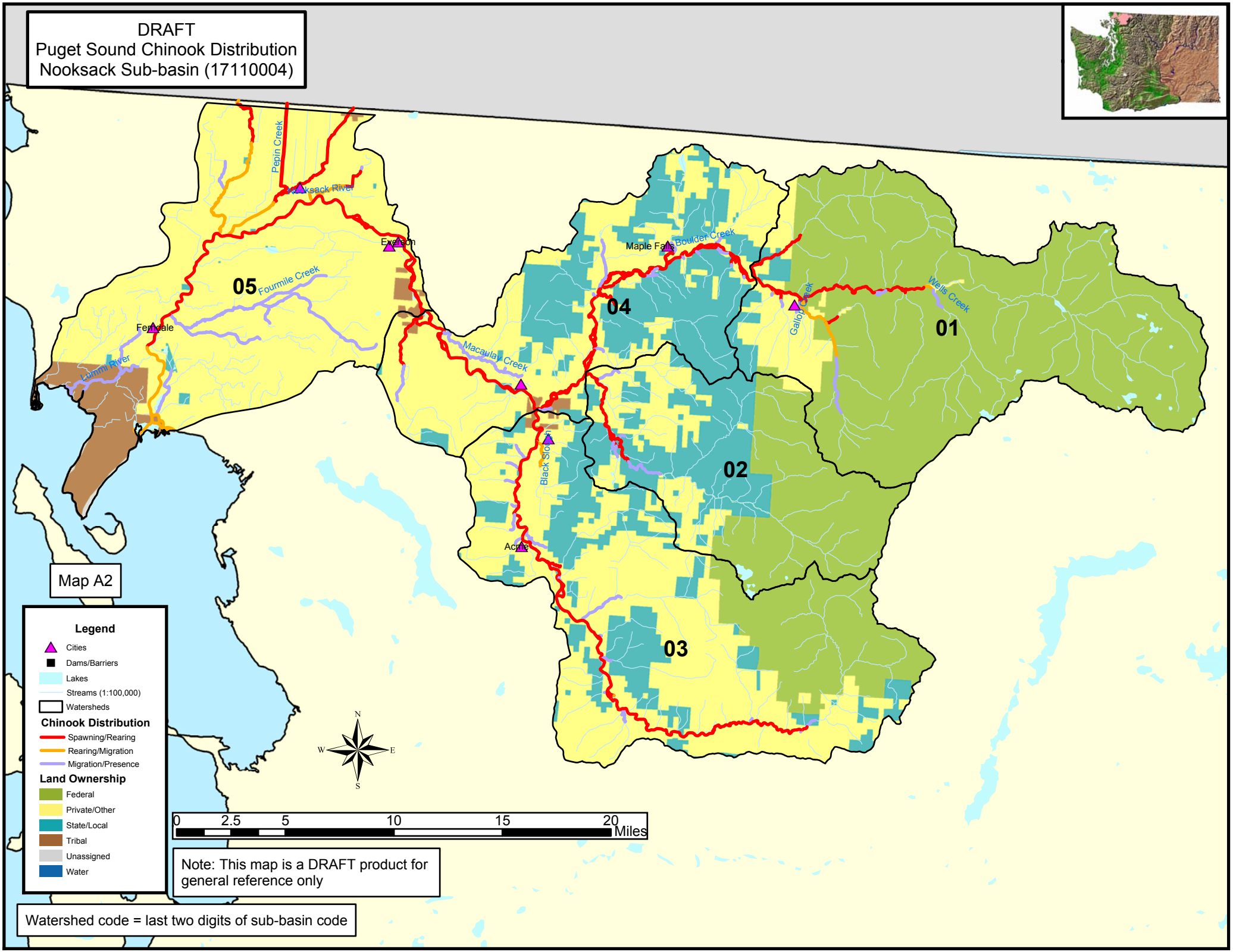
**Land Ownership**

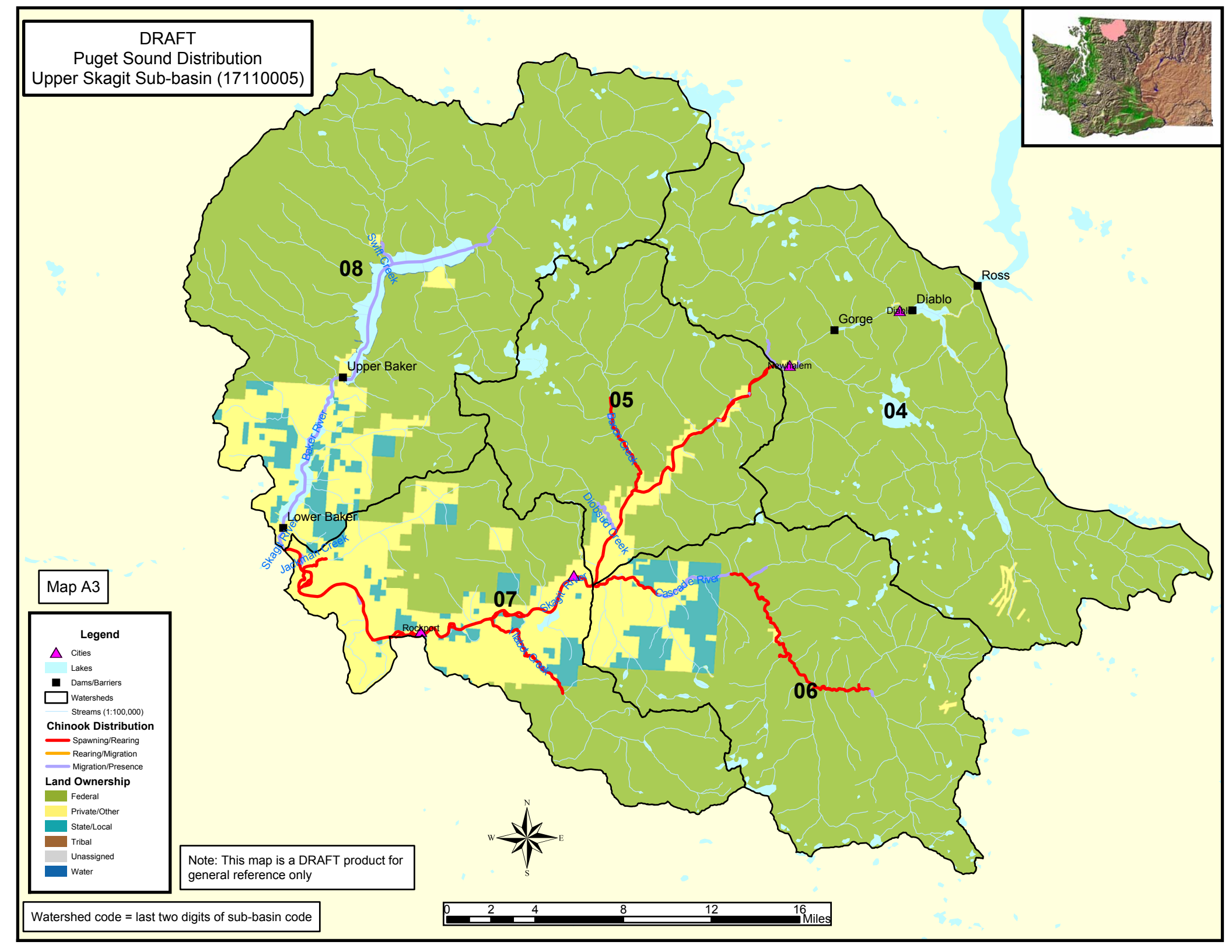
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

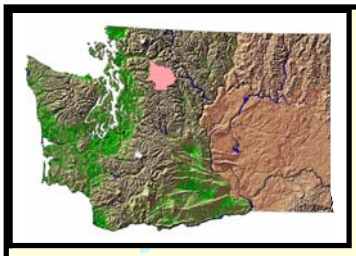
Watershed code = last two digits of sub-basin

Note: This map is a DRAFT product for general reference only

0 2 4 8 12 16 Miles


DRAFT
Puget Sound Chinook Distribution
Nooksack Sub-basin (17110004)
Pepin Creek
Nooksack River
Everson
Maple Falls
Boulder Creek
Wells Creek
Gallop Creek
Fourmile Creek
05
04
01
02
03
Ferndale
Lahmi River
Macaulay Creek
Black Slough
Acme
Map A2
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0 2.5 5 10 15 20
Miles
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code


DRAFT
Puget Sound Distribution
Upper Skagit Sub-basin (17110005)
08
05
04
07
06
Swift Creek
Upper Baker
Baker River
Lower Baker
Skagit River
Jackman Creek
Bacon Creek
Diobsud Creek
Cascade River
Rockport
Ross
Diablo
Gorge
Newhalem
Map A3
Legend
Cities
Lakes
Dams/Barriers
Watersheds
Streams (1:100,000)
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code
0 2 4 8 12 16
Miles



DRAFT
Puget Sound Chinook Distribution
Sauk Sub-basin (17110006)

04
03
02
01
Darrington
Tenas Creek
Dan Creek
Buck Creek
Downey Creek
White Chuck River
South Fork Sauk

Map A4

**Legend**

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

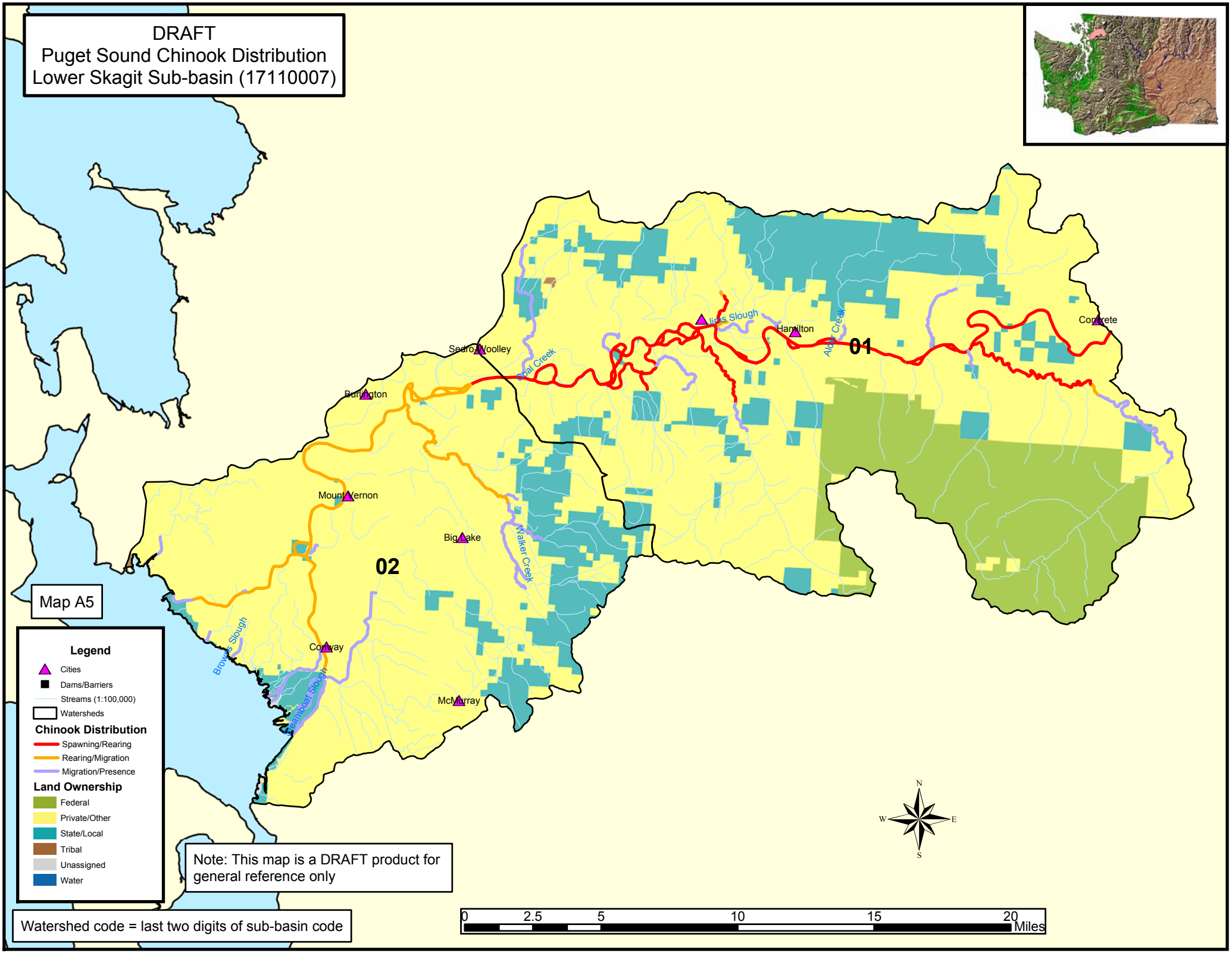
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

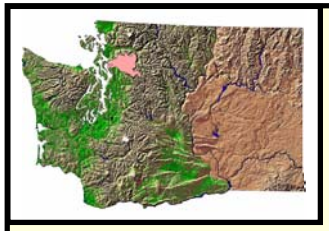
Note: This map isa DRAFT product for general reference only

N
W
E
S

Watershed code = last two digits of sub-basin code

0 2.5 5 10 15 20 Miles


DRAFT
Puget Sound Chinook Distribution
Lower Skagit Sub-basin (17110007)
Map A5
Legend
Cities
Dams/Barriers
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code
01
02
Sedro Woolley
Burlington
Mount Vernon
Big Lake
Conway
McMurray
Hamilton
Concrete
Coal Creek
Alder Creek
Walker Creek
Browns Slough
Steamboat Slough
Jims Slough
N
S
E
W
0
2.5
5
10
15
20
Miles



DRAFT
Puget Sound Chinook Distribution
Stillaguamish Sub-basin (17110008)

01

02

03

Stanwood

Warm Beach

Arlington

Granite Falls Fishway

Robe

Silverton

Grant Creek

Deer Creek

Rolling Creek

North Fork Stil

Boulder Creek

Stillaguamish Ri

Armstrong Creek

South Fork Stil

Jim Creek

Jordan Creek

Canyon Creek

Map A6

**Legend**

- Cities
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

N
W
E
S

0 2.5 5 10 15 20 Miles

Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin

DRAFT
Puget Sound Chinook Distribution
Skykomish Sub-basin (17110009)

Culmback
04
05
03
02
01
Monroe
Sultan
Gold Bar
Skykomish
Scenic
West Fork Woods
Woods Creek
Ewell Creek
Proctor Creek
Rapid River
Miller River
Tye River
Foss River

Map A7

**Legend**

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

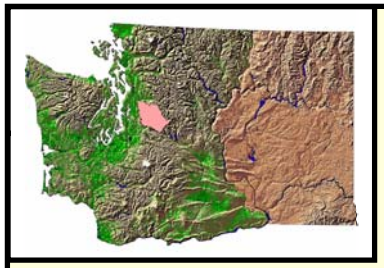
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Note: This map is a DRAFT product for general reference only

N
W
E
S

Watershed code = last two digits of sub-basin

0 2 4 8 12 16 Miles



DRAFT
Puget Sound Chinook Distribution
Snoqualmie Sub-basin (17110010)

High Rock
Tuex Creek
Cherry Creek
Duvall
Novelty
Snoqualmie River
04
North Fork Tolt
South Fork Tolt
Tolt River - South Fork
Tolt River
Carnation
Patterson Creek
Pleasant Hill
01
03
Canyon Creek
Fall City
Spring Glen
Tokul Creek
Snoqualmie Falls
Snoqualmie Falls
Snoqualmie
Raging River
02

Map A8

**Legend**

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

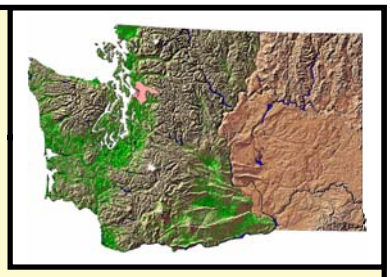
N
W
E
S

0 1.5 3 6 9 12 Miles

Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code

# DRAFT
# Puget Sound Chinook
# Snohomish Sub-basin (17110011)



Lakewood
Stimson Crossing
North Marysville
Middle Fork Quil
Lake Cavanaugh Creek
Allen Creek
Marysville
Steamboat Slough
Ebey Slough
Granite Falls
Lake Stevens
01
West Lake Stevens
Everett
02
Cavalero Corner
Mukilteo
Three Lakes
Pilchuck River
Snohomish
South Snohomish
Larimers Corner
Roosevelt
Skykomish River
Cathcart

Map A9

## Legend

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

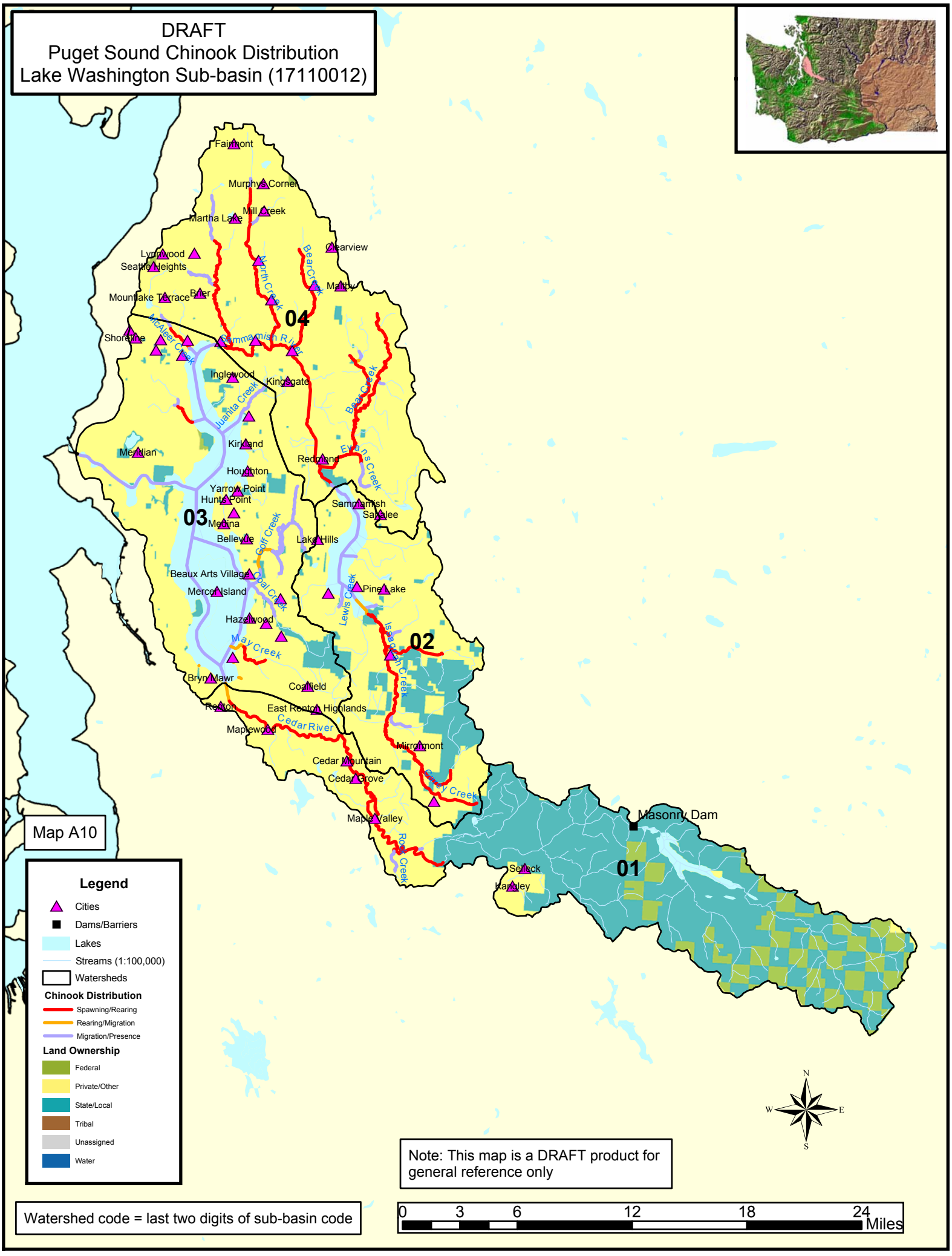
- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

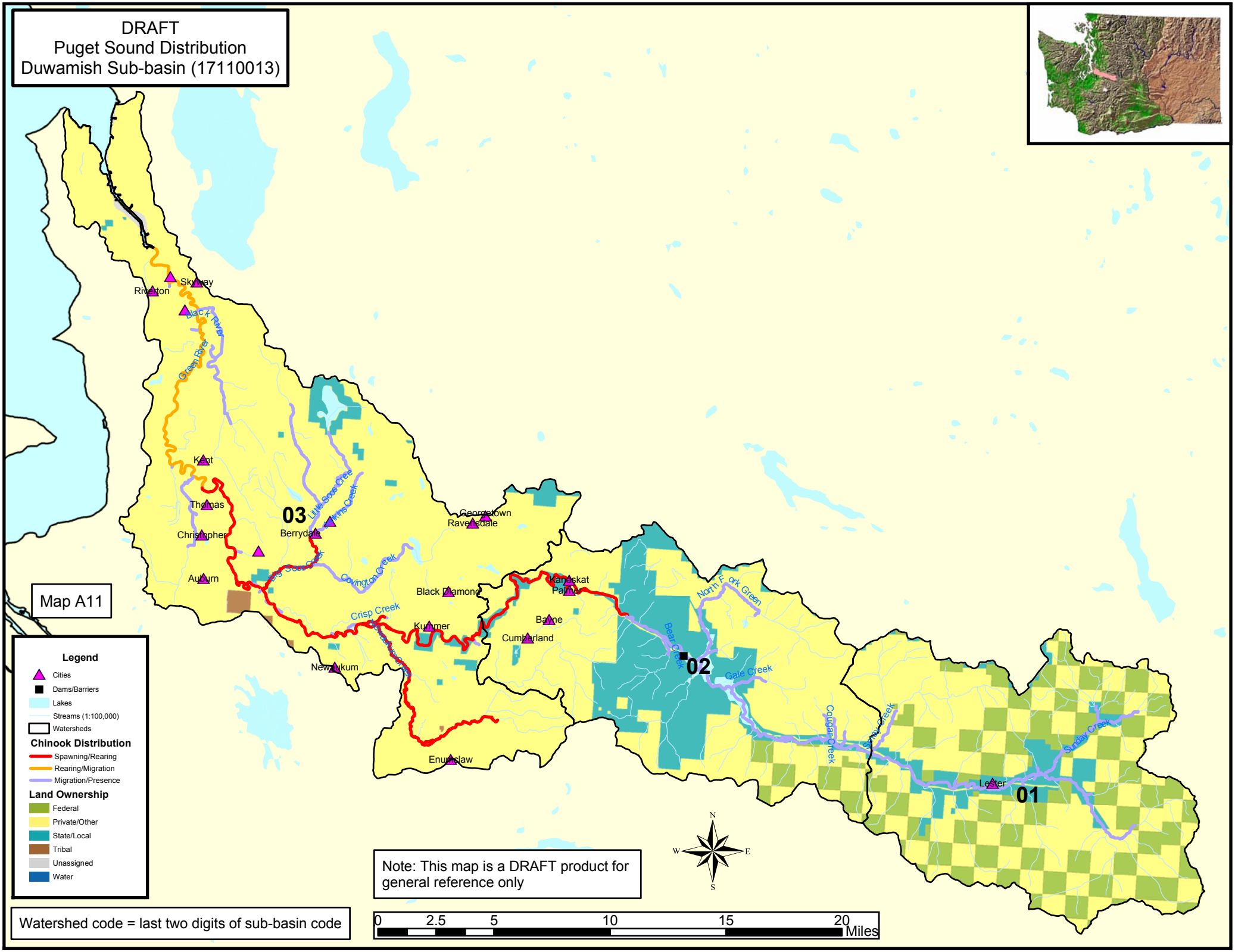
N
W
E
S

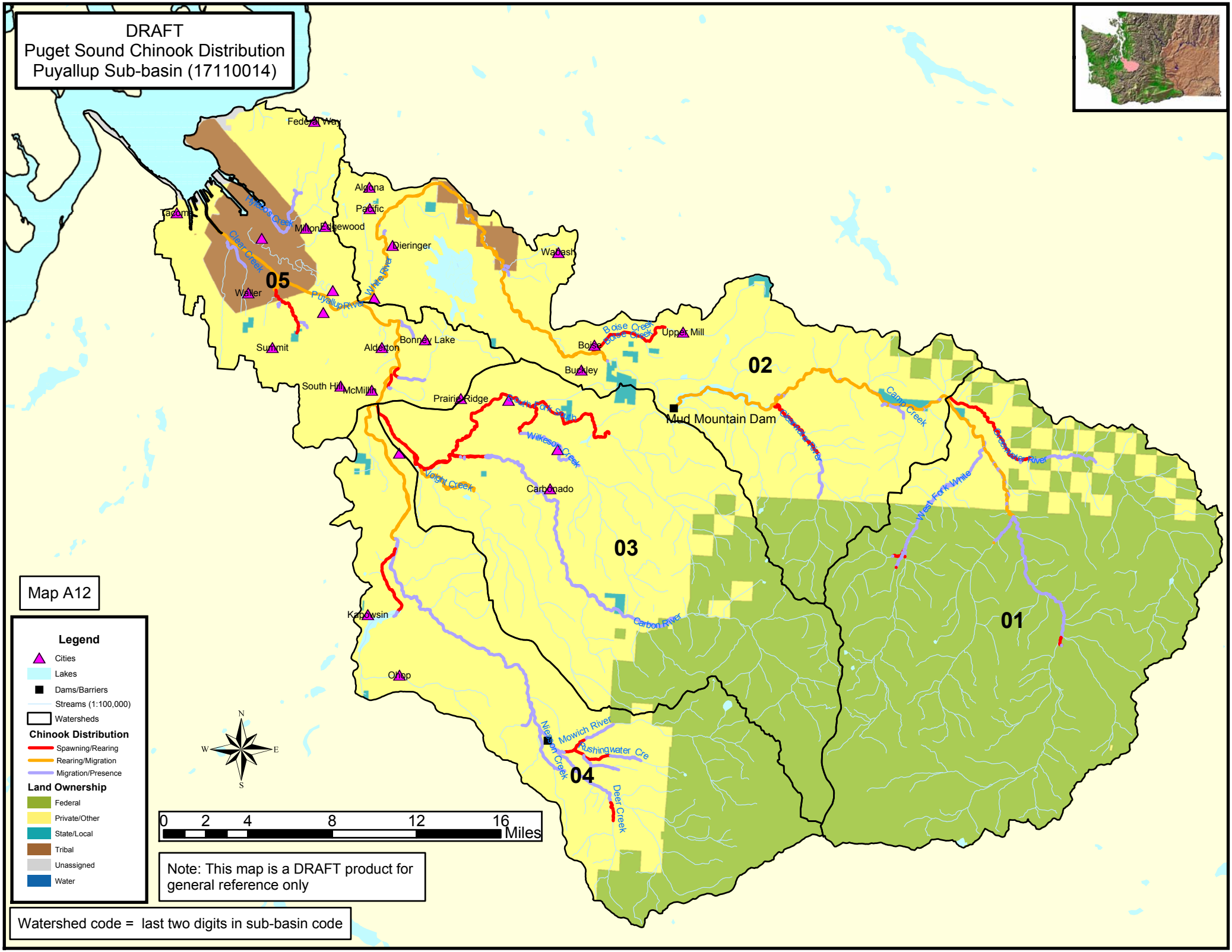
0 1.5 3 6 9 12 Miles

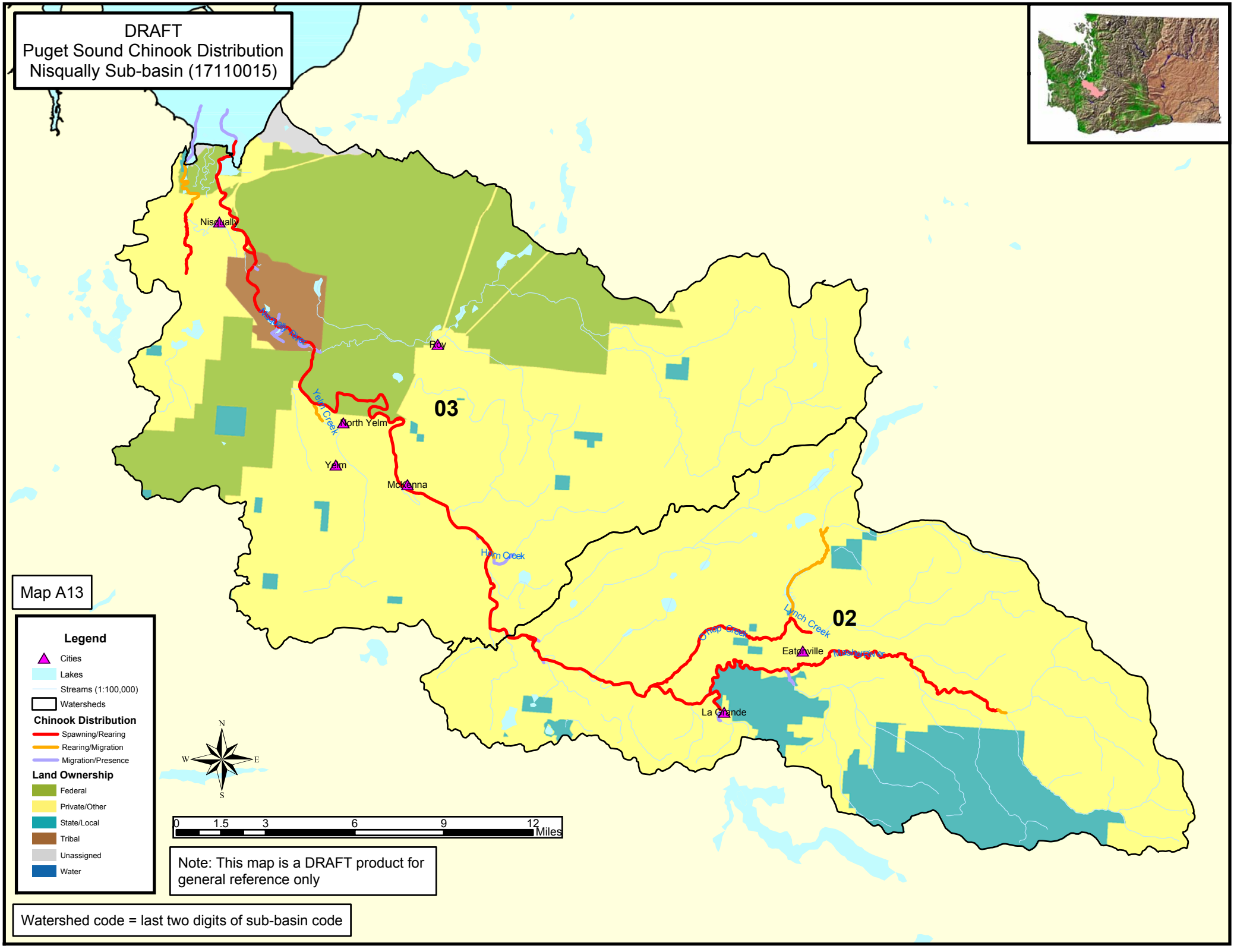
Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for general reference only

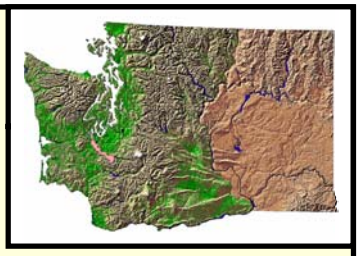

DRAFT
Puget Sound Chinook Distribution
Lake Washington Sub-basin (17110012)
Fairmont
Murphys Corner
Mill Creek
Martha Lake
Lynnwood
Seattle Heights
Clearview
Mountlake Terrace
Brier
Maltby
North Creek
Bear Creek
04
Shoreline
McAleer Creek
Sammamish River
Inglewood
Kingsgate
Juanita Creek
Bear Creek
Kirkland
Meridian
Redmond
Evans Creek
Houghton
Yarrow Point
Hunts Point
Sammamish
Sahalee
03
Medina
Bellevue
Lake Hills
Golf Creek
Coal Creek
Beaux Arts Village
Mercer Island
Pine Lake
Lewis Creek
Issaquah Creek
Hazelwood
02
May Creek
Bryn Mawr
Coalfield
Renton
East Renton Highlands
Cedar River
Maplewood
Mirrormont
Cedar Mountain
Cedar Grove
Issaquah Creek
Maple Valley
Rock Creek
Masonry Dam
Selleck
Kanley
01
Map A10
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code
0 3 6 12 18 24
Miles


DRAFT
Puget Sound Distribution
Duwamish Sub-basin (17110013)
Map A11
Legend
Cities
Dams/Barriers
Lakes
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is a DRAFT product for general reference only
0 2.5 5 10 15 20 Miles
N
S
E
W
01
02
03
Renton
Skykay
Kent
Thomas
Christopher
Auburn
Berrydale
Georgetown
Ravensdale
Black Diamond
Kanaskat
Palmer
Kummer
Baxne
Cumberland
Newaukum
Enumclaw
Lester
Green River
Black River
Little Soos Creek
Jenkins Creek
Big Soos Creek
Covington Creek
Crisp Creek
North Fork Green
Bear Creek
Gale Creek
Cougar Creek
Sunday Creek


DRAFT
Puget Sound Chinook Distribution
Puyallup Sub-basin (17110014)
Map A12
Legend
Cities
Lakes
Dams/Barriers
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Federal Way
Algona
Pacific
Auburn
Milton
Edgewood
Tacoma
Fife
Clear Creek
Fivemile Creek
Dieringer
Wabash
Waller
Puyallup River
White River
Summit
Alderton
Bonney Lake
South Hill
McMillin
Prairie Ridge
Boise Creek
Upper Mill
Boise
Buckley
Mud Mountain Dam
South Fork South
Wilkeson Creek
Voight Creek
Carbonado
Camp Creek
Greenwater River
West Fork White
Kapowsin
Orting
Carbon River
Mowich River
Nielson Creek
Rushingwater Cre
Deer Creek
05
02
03
01
04
N
W
E
S
0 2 4 8 12 16
Miles
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits in sub-basin code


DRAFT
Puget Sound Chinook Distribution
Nisqually Sub-basin (17110015)
Nisqually
Roy
North Yelm
Yelm
McKenna
Yelm Creek
Horn Creek
Lynch Creek
Eatonville
La Grande
03
02
Map A13
Legend
Cities
Lakes
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0 1.5 3 6 9 12 Miles
Note: This map is a DRAFT product for general reference only
Watershed code = last two digits of sub-basin code

DRAFT
Puget Sound Chinook Distribution
Deschutes Sub-basin (17110016)



Map A14

**Legend**

- Cities
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

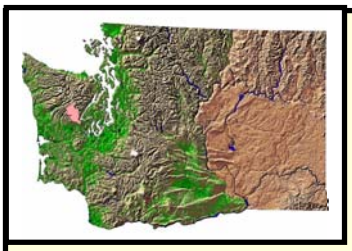
**Land Ownership**

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watershed code = last two digits of sub-basin code

Note: This map is a DRAFT product for general reference only

0 2 4 8 12 16 Miles



DRAFT
Puget Sound Chinook Distribution
Skokomish Sub-basin (17110017)

01

South Fork Skoko
Brown Creek
Cushman No 1
North Fork Skoko
Fir Creek
Vance Creek
Skokomish River
Weaver Creek
Purdy Creek
Skokomish

Map A15

**Legend**

- Cities
- Lakes
- Dams/Barriers
- Streams (1:100,000)
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

N
W
E
S

Note: This map is a DRAFT product for general reference only

Watershed code = last two digits of sub-basin code

0 1.5 3 6 9 12 Miles

DRAFT
Puget Sound Chinook Distribution
Hood Canal Sub-basin (17110018)

Map A16

**Legend**

- Cities
- Dams/Barriers
- Streams (1:100,000)
- Lakes
- Watersheds

**Chinook Distribution**

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence

**Land Ownership**

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watershed code = last two digits of sub-basin code

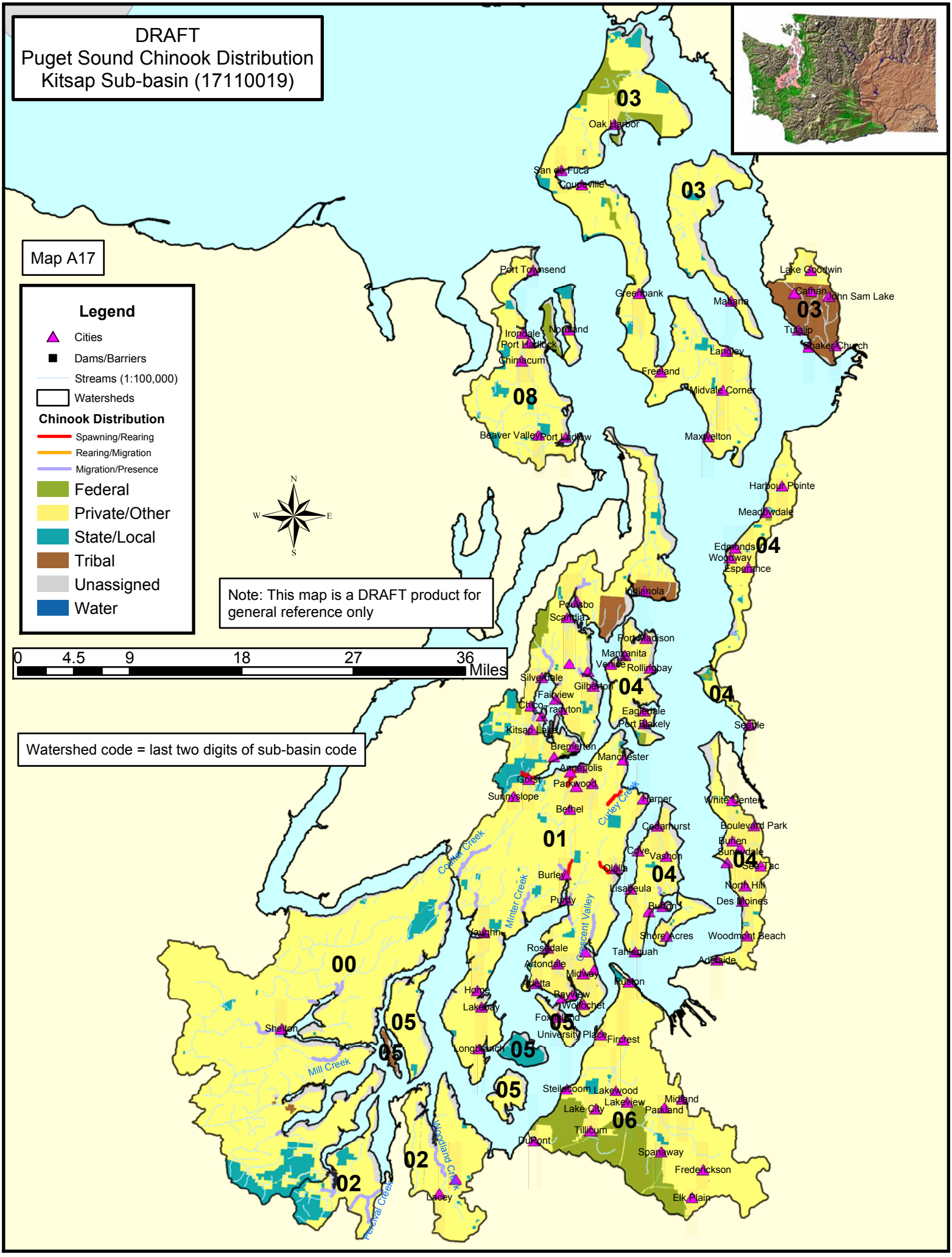
Leland
Quilcene
Big Quilcene River
Brinnon
Dosewallips River
Duckabush River
Olympic View
Brieadablick
Anderson Creek
Elden
Lilliwaup
Hoodsport
Tahuya
Berry Creek
Skokomish River
Mission Creek
Dewatto River
Belfair

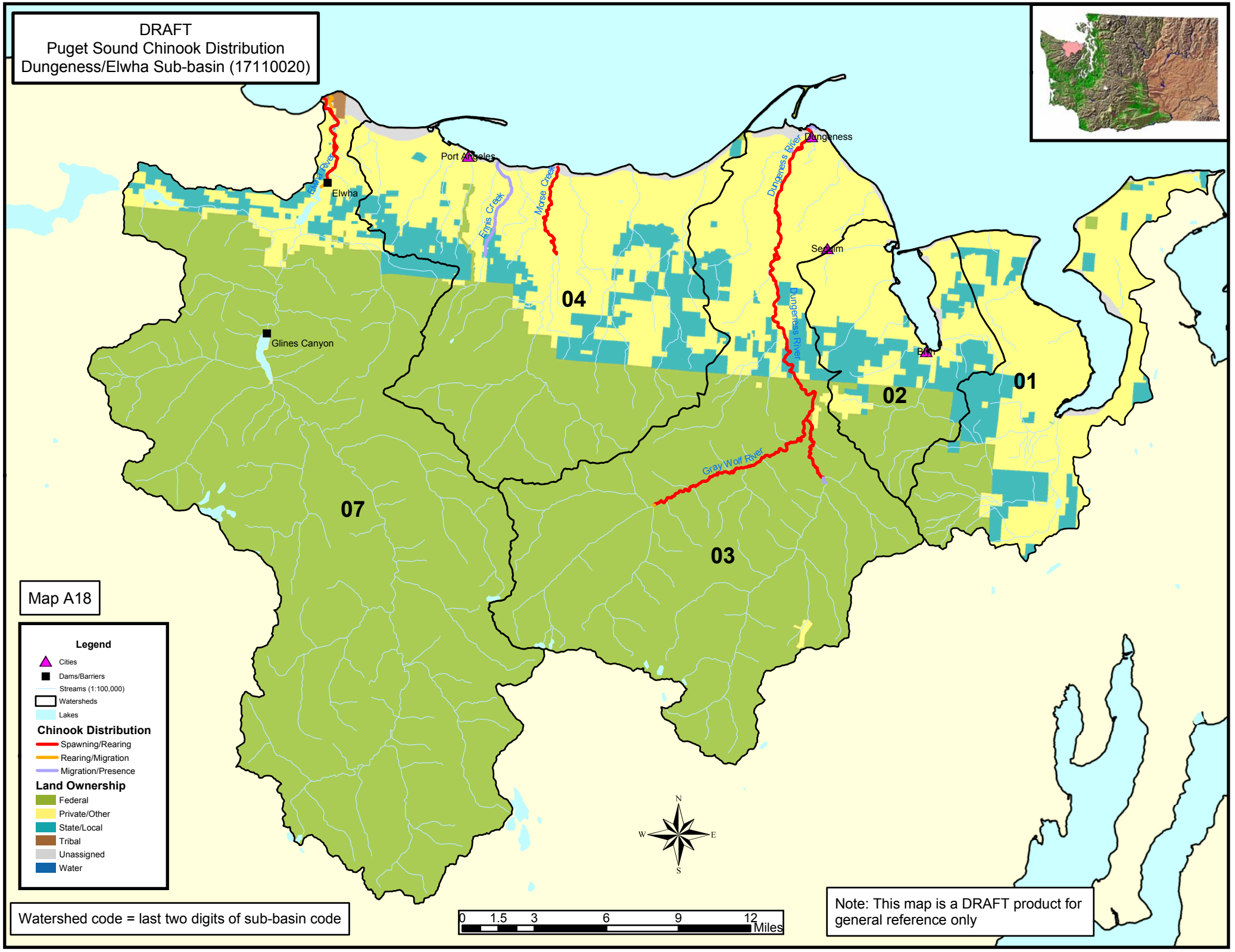
05
06
07
07
04
03
02
02
08

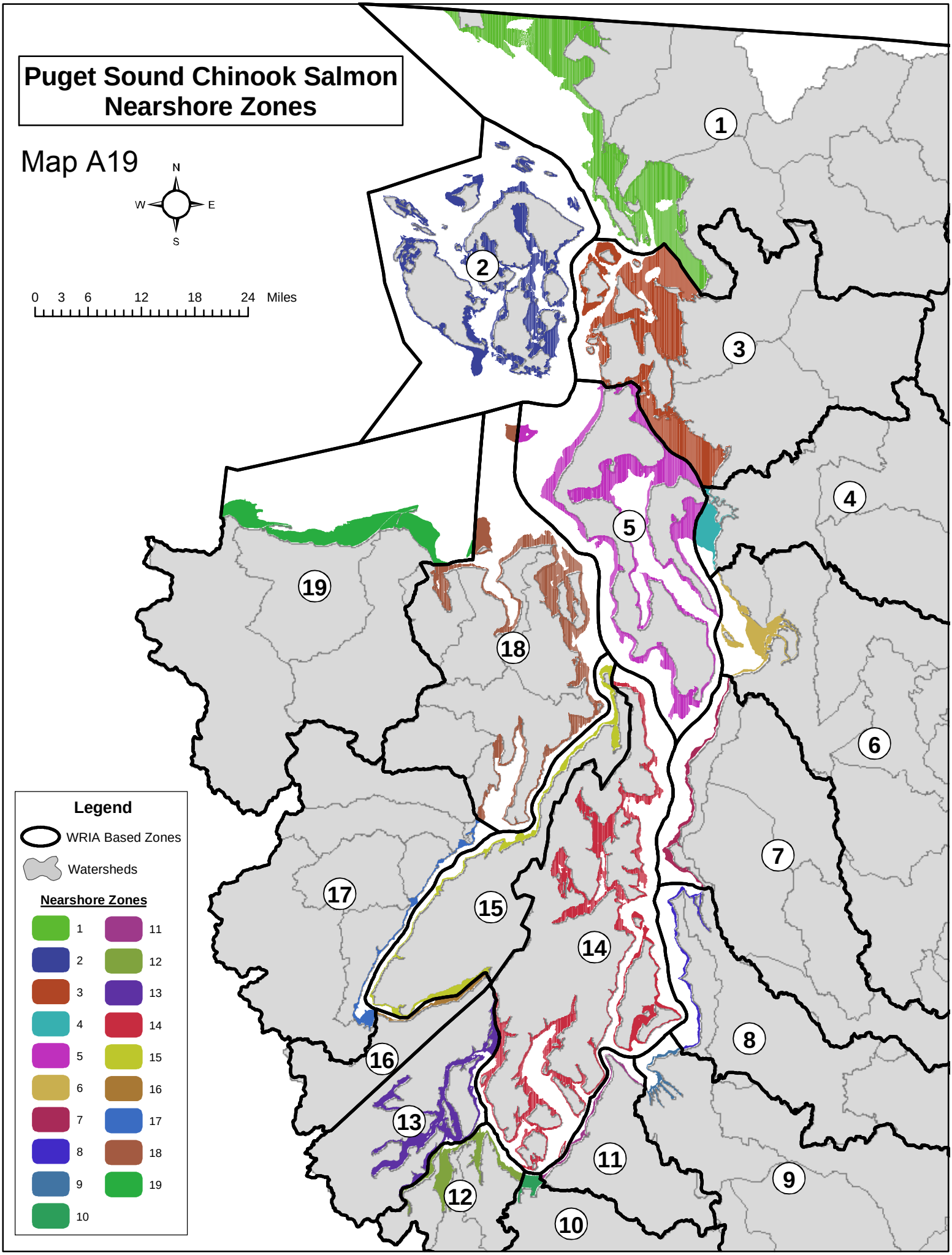
N
W
E
S

0 2 4 8 12 16 Miles

Note: This map is a DRAFT product for general reference only


DRAFT
Puget Sound Chinook Distribution
Kitsap Sub-basin (17110019)
Map A17
Legend
Cities
Dams/Barriers
Streams (1:100,000)
Watersheds
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Note: This map is a DRAFT product for general reference only
0 4.5 9 18 27 36 Miles
Watershed code = last two digits of sub-basin code
N
W
E
S
03
08
04
01
00
05
02
06
Oak Harbor
San de Fuca
Coupeville
Port Townsend
Greenbank
Madrona
Lake Goodwin
Cathan
John Sam Lake
Tulalip
Shaker Church
Langley
Freeland
Midvale Corner
Irondale
Port Hadlock
Nordland
Chimacum
Beaver Valley
Port Ludlow
Maxwelton
Harbour Pointe
Meadowdale
Edmonds
Woodway
Esperance
Indianola
Poulsbo
Scandia
Port Madison
Manzanita
Ventle
Rollingbay
Silverdale
Gilberton
Fairview
Chico
Tracyton
Eagledale
Port Blakely
Seattle
Kitsap Lake
Bremerton
Manchester
Annapolis
Gorst
Parkwood
Sunnyslope
Bethel
Curley Creek
Harper
White Center
Cedarhurst
Boulevard Park
Burien
Sunnydale
Sea-Tac
Cove
Vashon
Olalla
Lisabeula
North Hill
Des Moines
Burley
Purdy
Burton
Cooker Creek
Minter Creek
Crescent Valley
Vaughn
Shore Acres
Woodmont Beach
Rosedale
Artondale
Tahlequah
Adelaide
Midway
Ruston
Home
Lakebay
Bayview
Wollochet
Fox Island
University Place
Firchest
Shelton
Longbranch
Mill Creek
Steilacoom
Lakewood
Lakeview
Midland
Parkland
Lake City
Tillicum
DuPont
Spanaway
Fredrickson
Elk Plain
Lacey
Woodland Creek
Percival Creek


DRAFT
Puget Sound Chinook Distribution
Dungeness/Elwha Sub-basin (17110020)
Elwha River
Elwha
Port Angeles
Ennis Creek
Morse Creek
Dungeness River
Dungeness
Sequim
Glines Canyon
Gray Wolf River
04
07
03
02
01
Map A18
Legend
Cities
Dams/Barriers
Streams (1:100,000)
Watersheds
Lakes
Chinook Distribution
Spawning/Rearing
Rearing/Migration
Migration/Presence
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
0 1.5 3 6 9 12
Miles
Watershed code = last two digits of sub-basin code
Note: This map is a DRAFT product for general reference only


Puget Sound Chinook Salmon
Nearshore Zones
Map A19
N
W
E
S
0 3 6 12 18 24 Miles
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Legend
WRIA Based Zones
Watersheds
Nearshore Zones
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19